The Northwestern MILLER
MILLING PRODUCTION SECTION

Growing Importance of Cereal Foods Explained:

NINE ESSENTIALS IN FOOD

By Dr. Robert A. Larsen
Manager, Central Research Division, Pillsbury Co.

MY GRANDMOTHER'S name was Elizabeth Celia George. She raised seven children. Five were strapping boys and two were lovely girls.

Grandmother had a common sense way of explaining things, a way often found among folks who spent their lives on the prairie. Her speech was full of pithy sayings like "people in glass houses shouldn't throw bricks" or "I see said the blind man but he didn't see at all." Her saying that I remember most clearly is "Some people live to eat, but most people eat to live."

Grandmother's life was a hard one and her means often frugal. She knew what was required to feed a large family, and her children will attest to the fact that she fed them well—plenty of food, good food, and food good for them.

I wonder what Mrs. George would say about the food we eat today. Our present day food is better, and we know much more about it. The modern day housewife feeds not only good tasting food to her family—she has new, simpler, more appealing ways to prepare it. And her meals also contain a precisely balanced diet.

It is interesting to note that this balanced diet includes many old-fashioned foods. Grandmother's pancakes, her buttered noodles, her home-baked bread still find an important place on the American table. These foods are not only good to eat but are good for you.

NO SINGLE FOOD furnishes all of the necessary nutrients in their proper proportion to maintain good health. Some foods are better than others. Today we know what foods we should eat, we know how they should be combined and we know when to eat them.

Our government has recognized the need to get information on food before the public. The Institute of Home Economics of the U.S. Department of Agriculture is devoted to this task. After much careful research and fact collecting, they have published a booklet called "The Essentials of an Adequate Diet," which contains much interesting information on nutrition which should be a part of every housewife's knowledge.

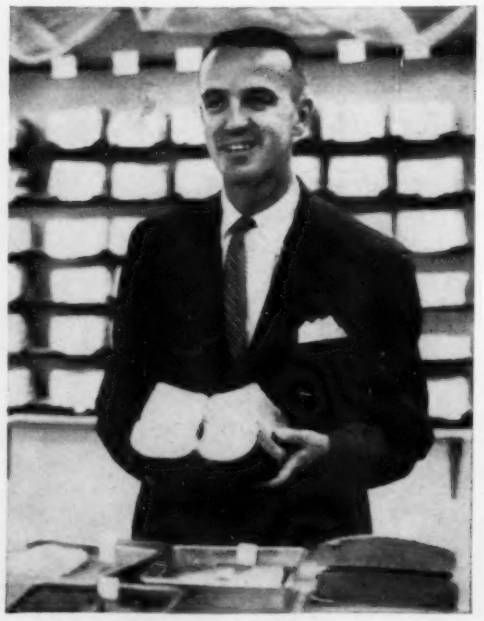
Food, as these research people see it, can be divided into four basic groups: milk, meat, vegetables and fruit, and bread and cereals. Everyone should drink some milk each day. Children should have from three to four cups, teenagers four or more cups and adults two or more cups. Each of us should have two or more servings of meat, such as beef or veal, pork, lamb, poultry, fish or eggs. As possible alternates for meat, dried beans, dried peas and nuts are suggested.

FOUR OR MORE daily servings are needed of vegetables and fruits. They should include citrus fruit or any other fruit or vegetable which is high in vitamin C. They should also include a dark green or dark yellow vegetable to give us Vitamin A. Finally, everyone should have four or more servings of bread or cereal products made from vitamin enriched flour or whole wheat.

To round out the meals and to make the daily menu more appetizing, everyone uses some other foods. Butter, margarine, other fats and oils and sugars are usually added to the food during preparation or at the table. These other foods supply calories and in some cases add nutrients to the meal.

This, after all, is not a startling departure from what grandmother did. An interesting part of this new USDA daily food plan is the way in which it was constructed.

The recommendations of the Food and Nutrition Board are the basis for the plan. This board is part of the National Research Council-Academy of Sciences. The Academy of Sciences was set up by President Abraham Lincoln as a group of impartial, scientifically trained people to advise the government in scientific matters. The scientists serve without pay and take time from their regular jobs to assist the government and to arrive at impartial answers to scientific problems. Foods are part of their responsibility.



Dr. Robert A. Larsen

THE FOOD NEEDS of man do not vary as much as might be expected. Generally speaking, the child needs about as much food as an adult, while our teenagers and pregnant mothers require from 10 to 20% more. These food needs can be broken into nine categories: calories, protein, iron, calcium, Vitamin A, Vitamin C, niacin, Vitamin B1 and Vitamin B2. The needed amounts of these various nutrients vary greatly. For calories the amounts can be measured in pounds, while the daily requirement for Vitamin B2 would fit on the end of a pin. The point is that the daily requirement for these foods is established and the minimum daily needs accurately measured. For an average adult, they are as follows:

Calories—	
From Fats	9½ oz.
From Carbohydrates or Protein	1 lb. 1 oz.
Protein	2½ oz.
Calcium	1/25 oz.
Vitamin A	1/185 oz.
Vitamin C	1/335 oz.
Iron	1/1760 oz.
Niacin	1/1760 oz.
Vitamin B1	1/13850 oz.
Vitamin B2	1/13850 oz.

If the diet is lacking in any of these, we suffer. All are essential. No food contains all of them. To attain these nine essential elements, a balanced diet is required.

CALORIES ARE NEEDED for fuel. Burning fats, carbohydrates or protein produce energy. This energy heats our body. It is expended each time we move or even think. If the energy is obtained from carbohydrates or protein, the average person needs about a pound and one ounce per day. If the energy comes from fats, we need much less, about nine and one-half ounces. If we eat more calories than we expend, we get fat; if we eat fewer, we lose weight.

Our next requirement is for protein. Protein is the structural element of body tissues. It is the substance that makes muscle and holds our bones together. Two and one-half ounces of protein must go into this body building function each day or we end up feeling tired or in general ill health.

Iron is needed for good blood, calcium for strong bones. Vitamin A is essential for the growth of body cells. Without Vitamin A, we suffer from night blindness, we are susceptible to infections,

(Turn to ESSENTIALS, page 14a)

DO YOU REMEMBER

THE CALIFORNIA GOLD RUSH OF '49?

Over a hundred years ago, during the wild stampede to the gold fields of California, fortunes were made overnight panning and sluicing the precious metal.

Actually, the first California gold was discovered at Sutter's mill, and later it was common practice to accept gold dust in payment for flour.

Times have changed, but SWISS SILK is still the same fine sifting material it was in 1849, for it was then the miller's favorite bolting cloth.

Millions of barrels of American flour have been sifted in the last century, and SWISS SILK, the preferred sifting medium for longer than any living miller can remember, is still the standard of excellence.

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Electronics May Someday Protect Stored Grain From Insect Damage

Rays from radioactive materials also reveal promise as weapon against pests, Nebraska Experiment Station-USDA studies show

By Stuart O. Nelson

FARMERS may someday use electricity to kill insects in stored grain.

For several years, research workers at the Nebraska Experiment Station have been using high frequency electric fields to kill weevils and flour beetles in small batches of wheat. The insects die within a few seconds when they are exposed to the high frequency radiation.

Apparently the treatment does not lower the germination of the wheat. In fact, treated seed often germinates sooner than untreated seed, and early plant growth is speeded up. Similar improvement in germination and early growth has been noted in corn and other crops.

It even appears that electrical heat treatment prior to milling may improve the baking qualities of flour made from the wheat. Moisture removal and prevention of mold in storage are other benefits that may come from electrical treatment of grain. Also, this method leaves no residues like those left by chemical fumigants.

In the Nebraska experiments, insects are killed by placing infested grain between two parallel metal plates that form part of an electronic power oscillator. This is similar to equipment used for radio and television transmitters. The power oscillator sets up a field of several thousand volts between the two plates. The temperature of wheat placed between the plates is raised as much as 50° or 60° F. in 3 or 4 seconds.

This process, by which relatively poor electrical conductors are heated when exposed to a high-frequency electric field, is known as dielectric heating. It is different from any other method of heating commonly used. Not only is the speed of heating much faster, but the heat is generated within the wheat and insects themselves as they absorb energy from the field.

The rate of heating depends on the electrical characteristics of the material being treated. If insects have electrical characteristics more favorable for heating than the grain they infest, their body temperatures can be raised to a killing point without heating the grain to damaging temperatures. For example, adult rice weevils, under certain conditions, heat about one and a half times faster than wheat. Their temperature can be raised to a deadly level with treatments that bring the wheat to about 100° F.

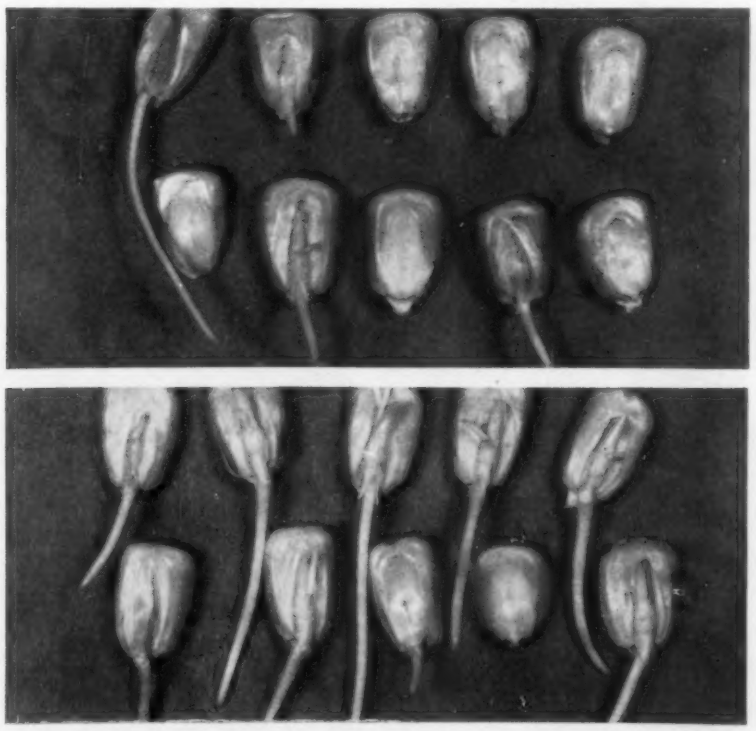
Young Hard to Kill

One of the problems is that different temperatures are required to kill insects in different stages of maturity. To kill immature rice weevils, which are always found with the adults, it is necessary to use treatments that raise the temperature of wheat to about 140° F. In the Nebraska tests, this temperature did not damage wheat with a moisture content of less than 13.5%. Moisture content of seeds is very important in determining the maximum temperatures they can tolerate.

Although laboratory tests are conducted with small samples of infested grain, scientists are learning many basic lessons that will apply to grain in large quantities. Problems involved in the transition to field application are not expected to be very serious. Some large scale experimental work has already verified the laboratory findings.

Large quantities of grain will probably be treated as they move between

Scientists use electrical equipment to make rapid moisture tests of grain. For accurate measurements, samples are weighed, dried in an oven, then weighed again.



Dielectric treatment of grain seeds germination. Kernels of seed corn, top, were not treated; those below were exposed to high frequency field 5 seconds.

A plastic box filled with wheat and insects placed in dielectric heater.

Wheat samples ready for treatment and, below, examining dead insects.

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the metal plates either in a chute or on a conveyor belt. Chutes and belts will have to be made from materials that are not heated by the high-frequency field and that will not interfere with the action of the field.

EDITOR'S NOTE: The author is research associate in the department of agricultural engineering at the Nebraska Experiment Station and is agricultural engineer with the farm electrification laboratory, agricultural engineering research division, Agricultural Research Service, U.S. Department of Agriculture. USDA entomologists of the Agricultural Marketing Service stored products insects laboratory at Manhattan, Kansas, are also cooperating in these studies. This report and pictures are reprinted here through the courtesy of the Nebraska Experiment Station Quarterly magazine.

Synthetic materials are now available that would be suitable for making equipment of this type.

Further investigations are planned to learn how insects can be controlled without raising the temperature of the grain to such high levels. If insects could be controlled at lower grain temperatures, dielectric treatment would be cheaper because energy absorption by the grain increases the costs of treatment. As a part of the temperature study, entomologists are trying to learn more about what actually happens to the insects during treatment.

Deadly Rays Studied

In addition to dielectric heating, there are some other new possibilities for insect control. Scientists believe that the ionizing beta and gamma rays, emitted from radioactive materials, may someday be applied to stored-grain insects.

Measuring the temperature of treated roaches (on table). Thermocouples are inserted into the insects' bodies, and temperatures are recorded on chart.

Beta rays are high speed electrons. At present, the most likely electron sources for insect control are electron accelerators. This type of electronic apparatus is now being used in industrial research and production, and in laboratories at other colleges.

Electrons have limited penetration capabilities, and the thickness of material being treated will probably be limited to less than one inch. Thus, infested grain would have to be treated in thin layers. In contrast, gamma rays are very penetrating. The most economical sources for gamma radiation will probably be spent fuel elements from nuclear reactors.

In using either beta or gamma rays —or any other type of ionizing radiations—adequate shielding to provide safe working conditions will be necessary.

Tests show that doses of radiation large enough to kill insects also damage grain for seed purposes, but do not seem to affect milling and baking qualities. Lower doses of radiation sterilize insects so they cannot multiply, but still cause injury to seed grains.

Beta and gamma rays kill immature insects more readily than adults, while the opposite is true for high frequency electrical treatments.

—BREAD IS THE STAFF OF LIFE—

Ferguson Fumigants Completes Addition

L. E. McQuillen, mill service manager, Ferguson Fumigants, Inc., has announced completion of a building addition which doubles the "Squirt" manufacturing and warehousing facilities.

Situated on a three-acre tract in the St. Louis industrial suburb of Hazelwood, Mo., the new building is constructed to allow for further expansion. With the latest addition, "Squirt" equipment manufacturing and repairing facilities, and fumigant manufacturing are now accomplished under one roof.

"Present plans," Mr. McQuillen said, "are for Ferguson Fumigants to expand its product lines, packaging sizes and equipment availability. Right along with this, of course, goes even better service with the addition of professional fumigation specialists and personnel."

A typical experience in the work-a-day lives of thousands of industries.
DOGGONE IT, PETE, THIS HAS GOT TO STOP!
PLANT MANAGER
. . . just came from the bag-filling department . . . Not a man wearing a respirator.
I'm not surprised, Jim. The men would rather breathe dust than wear heavy old respirators.
I know it. But I'm supposed to enforce safety rules. Oh, for a light, comfortable dust mask!
Seen Purchasing yet? They're up on new developments.
Here's what you want, men—The Flex-A-Foam Dust Mask—light as a feather!
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It's sure light and comfortable, but can it do a man-size job?
It should. It filters non-toxic dust particles 100 times smaller than you can actually see.
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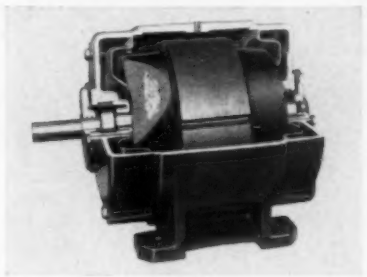
Maintaining the Modern Cage Motor

By F. C. Osterland
Motor and Generator Department, Allis-Chalmers Manufacturing Co.

TODAY's squirrel-cage induction motor is a highly efficient machine whose periods of trouble-free service can be considerably prolonged by systematic care.

Happily, new insulation systems have materially reduced maintenance requirements for the modern motor. Just what is a "modern" motor? If it's a large machine, with form wound stator coils, they will be protected with a unique silicone-rubber insulation. Smaller motors with random or mush-wound coils will have the windings firmly embedded in a block of epoxy resin.

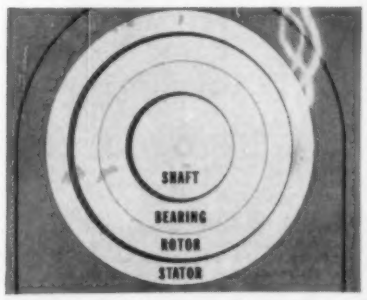
These new materials in open motors are making it possible to disregard many plans of motor protection and maintenance steps needed to keep a conventional motor in good operating condition. Such precautions as guarding against moisture, oil or vapors, or regular cleaning and revarnishing of windings have been outmoded. Users can forget about ambient conditions, total enclosures or special ventilating arrangements. At the same time, the maintenance man's job is simplified and motor life is prolonged.



Stators of smaller motors are now encapsulated in epoxy resin insulation which completely fills the slots and coils, leaving a hard, nonporous, smooth and impervious surface.

Silicone-rubber-insulated stator coils can be vulcanized and sealed so well that motors can be tested at high voltage while fully immersed in water. Epoxy-encapsulated motors have been load-tested in hundreds of hours operation while fully immersed in salt water. Abrasive or conductive dusts have little effect. Oils, chemicals, vapors and other contaminants are sealed out.

Certain precautions remain to be observed, however, to assure carefree operation of this modern motor. First, a word of warning about motor loading. Silicone-rubber insulations are inherently Class H, and can take operating temperatures of 200° C. or more. Quite often, however, the machine will be rated far more conservatively, with Class A or B temperature limits, despite the insulation's capability.



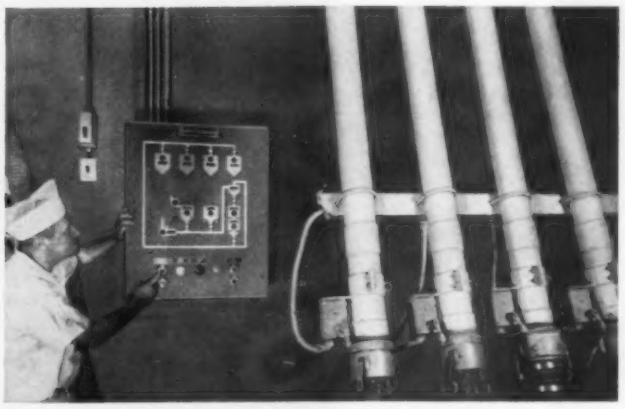
Worn bearings can result from an inaccurate supply of lubricant, the wrong lubricant, or so much load as to break down the lubricating film. This causes overheating by letting the rotor and stator rub together.

Watch the nameplate rating for temperature guarantees. The insulation can take a lot of heating during overload, if it's Class H and the machine is rated for B or A temperature rise, but chances are that the bearings and their lubricants won't stand up against excessive temperature. Mechanical fits in the machine, too, may give trouble. Your motor loses its efficiency when temperature guarantees are exceeded, and could fail to pull the overload.

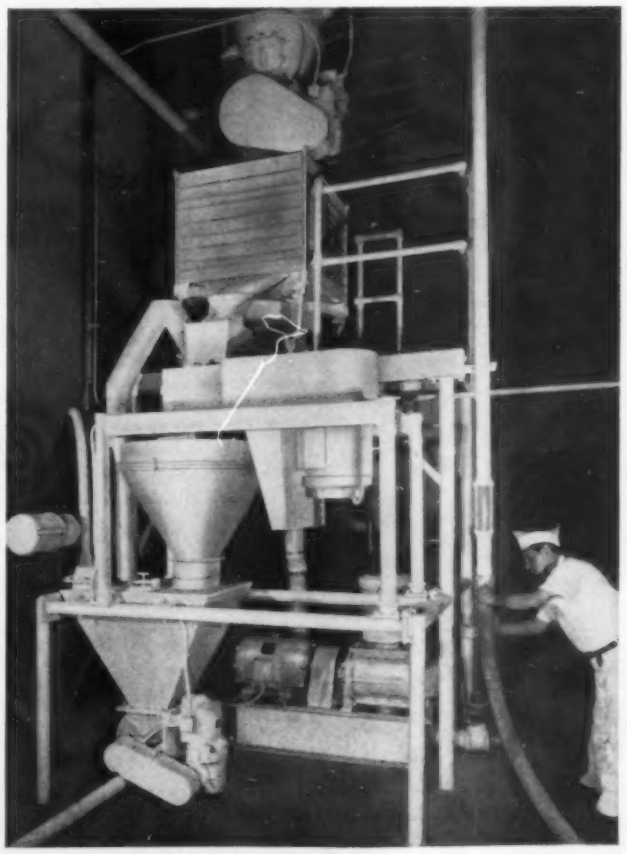
More Power Available

There's more power available in these new motors, with their open construction, than in the same rating of the enclosed type. Open machines have a 115% service factor, and are designed to run continuously at 115% of rated horsepower. Enclosures are added at the expense of this overload capability, and standard enclosed types have a service factor of only

The Arithmetic of Materials Handling



Central Control Panel of Jewel Tea's flour-handling system. At right are main conveying lines—each to a separate bin.



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Anti-friction bearings will overheat if they are over-lubricated because the balls will slide rather than roll.

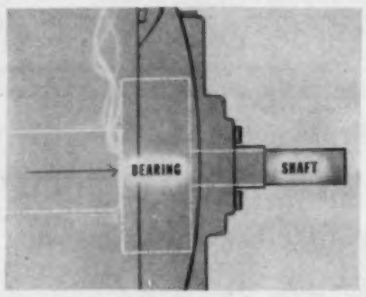
100%. Added service factor can be a lifesaver in emergencies.

Forget the insulation, but watch for mechanical troubles with bearings, alignment, etc. In theory no wear can take place within an electric motor's bearings if the surfaces are smooth, properly aligned and lubricated. In actual practice, however, bearings often get an inaccurate supply of lubricant, the wrong lubricant, or so much load that the lubricating film breaks down. Preventing these conditions is one of the main jobs of motor maintenance.

In the fight against friction, pay close attention to manufacturer's lubricant instructions. They generally specify type and grade of lubricant, frequency and method of lubrication, etc. Don't try to guess what grade or type to use. Although it's one of the lowest cost items in operating expense, nothing is apt to cause more trouble and expense than improper lubrication.

Where motors have sleeve bearings, it's important to see that oil rings are free and turning with the shaft. At regular intervals, best determined by local conditions, the oil reservoir should be flushed out, refilled, and the dust seals checked.

In motors having ball or roller anti-friction type bearings, the main purpose of grease is to guard the steel rolling elements and races from corrosion, not friction. Too much grease only promotes friction and heat.



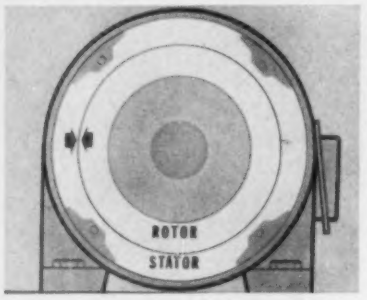
Rapid knocking can be a warning of misalignment that is causing the shoulder of the shaft to bang against the end of the bearing. If it is let go too long, you will get smoke signals.

Regardless of the type of motor bearings, the effective film of lubricant is often microscopically thin. Excessive loading can break it down, resulting in metal-to-metal contact and bearing failure in a matter of seconds. Needless tension in belt or chain drives should be avoided.

Misalignment Damage

Sprung or broken shafts, burned out bearings, or overload failure are examples of motor damage commonly caused by misalignment. This can occur in drive or driven machine, for when these elements are assembled in incorrect geometry, bending, breaking or excessive wear results.

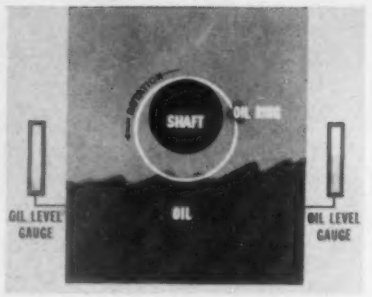
Nor is the trouble necessarily caused by improper original installation of equipment. Settlement of foundations, heavy floor loading or excessive bearing wear can all throw alignment out of kilter. Even though a motor and machine may be mounted on a common, rigid base, misalignment may occur. The base itself may have been mounted off-level, leading to a warp in its structure. Where spur gears are used in the drive, the tendency of these gears to push apart may disturb alignment in time. Obviously, alignment must be maintained, if motors are to be maintained.



Alignment is important because there is only a fine line of separation between a rotor and a stator—the magnetically saturated air gap that must be as narrow as possible for greatest efficiency. Even a small amount of distortion could cause a serious collision in this day of high speed motors.

Misalignment sometimes gives a warning. Excessive temperature may warn that it is causing bearing overload or motor overload. Increased vibration may be the warning signal. Or a rapid knocking may indicate that a shoulder of the shaft is being driven against the end of a bearing.

If the installation is not too heavy, it may be possible to loosen the mounting bolts of the motor or machine and experiment with variations in position while the set is in operation. Changes in degree of noise or



It's good maintenance practice to keep the motor's oil seals, well covers and plugs tight and never to lubricate sleeve bearings equipped with oil rings when the motor is running, thus giving a false level reading.

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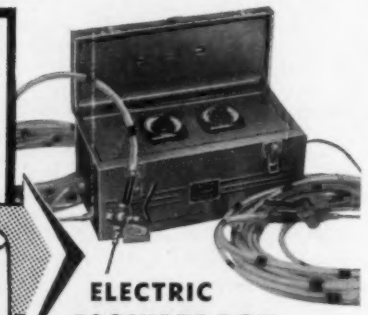

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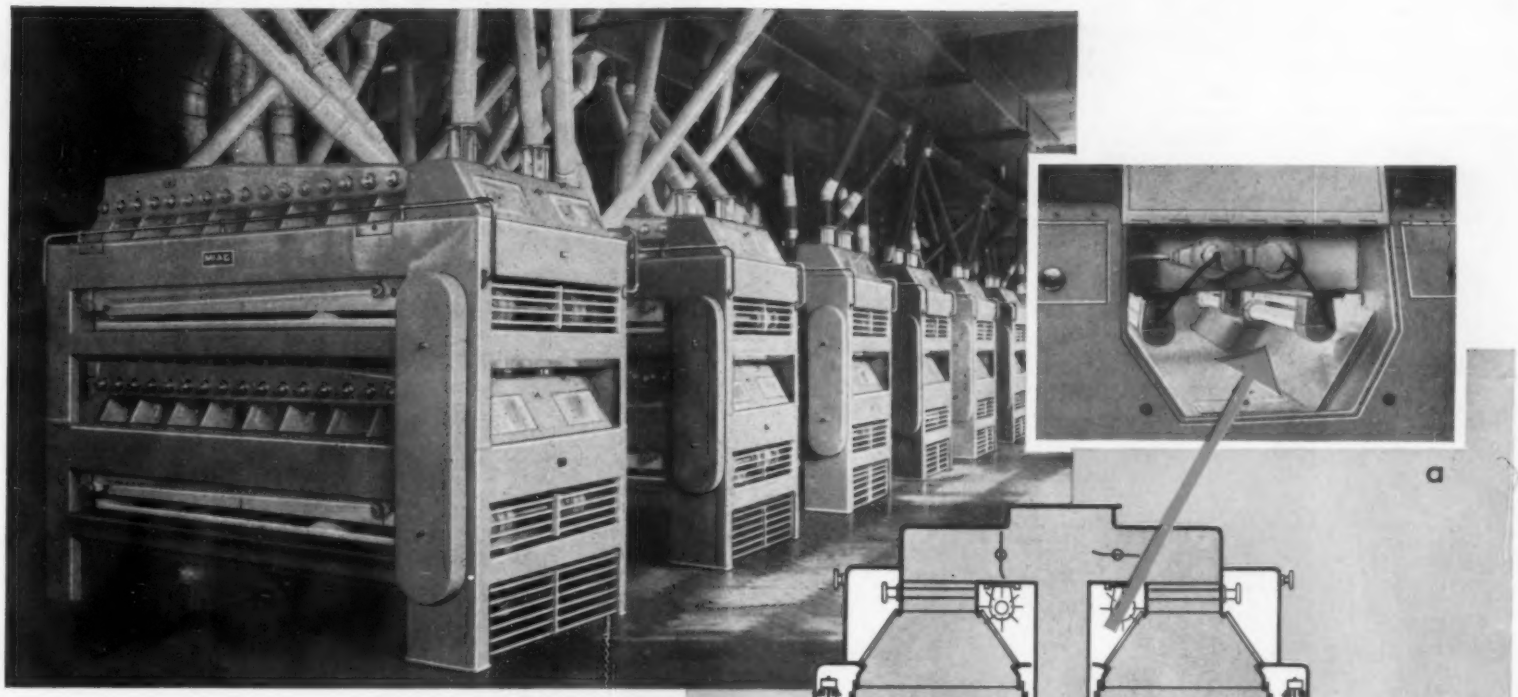

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a. interior lighting
b. scheme diagram purifier No 40 vK
c. metal sieve frames

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THE TRIMONT CORP., LTD.
P.O. BOX 25, STATION H, MONTREAL, CANADA

BRAUNSCHWEIG (Western Germany)

vibration will guide your efforts until the set is in line and the symptom disappears.

If a motor is off-level, the condition can be corrected by placing shims under the motor feet until the units are in line.

Even though alignment is perfect, vibration in the driven machine may be transmitted to the motor causing motor parts and electrical connections to shake loose, metals to crystallize and frictional wear to multiply. To find the source of vibration where alignment is correct, check the following points:

1. Tighten mounting bolts; check motor for loose parts.
2. Compare foundation for solidity with that of non-vibrating motors. Further improvement of conditions leading to vibration may be unnecessary or useless.
3. Check bearings for looseness. Generally, allow two thousandths of an inch clearance—plus one thousandth of an inch for each inch or fraction of an inch of journal diameter.
4. Disengage vibrating motor from driven machine. If motor operates far more smoothly when disconnect-

QUICK DIAGNOSIS OF MOTOR AILMENTS

Symptoms You Can See

Symptom	Possible Cure	Cure
1. Fine dust under coupling employing rubber buffers or pins.	Misalignment	Realign set.
2. Motor won't start.	Usually line trouble—single-phasing at starter.	Correct. Check source of power supply. DON'T merely try to make it go—while motor sits there and "fries!"
	Load too heavy. Disconnect motor to see if it starts without load.	Reduce load—or replace motor with unit of greater capacity.

Symptoms You Can Hear

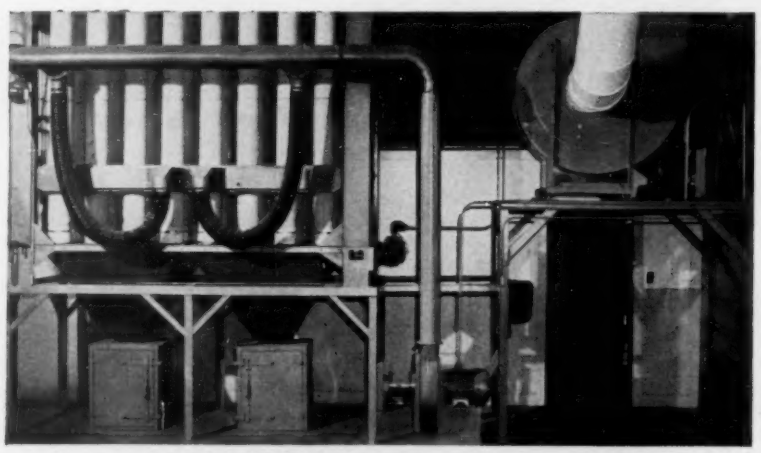
3. Excessive hum.	Uneven air gap. Measure with feelers.	Replace bearings—before introduction of scraping noise indicates rotor is rubbing against stator.
	Unbalanced rotor. Check on parallel bars.	Balance with weight attached by cap screw and lock washer.
4. Regular clicking.	Foreign matter in air gap.	Take out rotor; remove matter.
5. Rapid knocking.	Misalignment — probably causing shoulder of shaft to pound periodically against bearing end.	Realign set until knocking disappears.

Symptoms You Can Feel

6. Vibration.	Misalignment.	Realign set.
	Vibration in driven machine. Run motor disconnected for check.	Eliminate source in machine, if possible. Or change to a flexible belt drive may be in order.
7. Vibration — following motor repair.	Rotor out of balance due to holes drilled or weights shifted . . . new rotor coil or coils.	Balance rotor.
8. Motor over-heating. (Check with thermometer — don't depend on hand.)	Overload. Measure load; compare with name-plate rating.	Check for excessive friction in motor, drive or machine. Reduce load, or replace motor with unit of greater capacity.
	Dirt in motor. Check flow of ventilating air.	Blow out motor. Clean wound section if necessary.
	Rotor rubbing on stator.	Replace bearings.
	Shorted stator windings.	Test with wattmeter and correct.
	Ground.	Locate with test lamp or growler and repair.
9. Bearing overheating.	Misalignment.	Realign set. And in this—as in all cases of bearings overheating — keep shaft turning until bearing is cooled . . . to prevent "freezing."
	Too much tension in chain or belt drive.	Reduce tension to point of adequacy.
	Excessive end thrust.	Reduce thrust from drive or machine. (Shaft should be permitted reasonable "axial" float.) Or if motor is off level, shim-up lower end to take thrust off its bearing.
10. Bearing overheating.	Too much grease (ball or roller bearing).	Relieve supply to point set by manufacturer.
	Sticking oil ring (sleeve bearing).	Clean, repair, or replace — as necessary.
	Insufficient lubricant.	Add—up to point set by manufacturer.

DAY

DUST CONTROL NEWS



An unhoused DAY "AC" dust filter* operating in work area of a manufacturing plant.

CUT FUEL COSTS—Return clean, warm, filtered air to work area

If you'll investigate, you'll find nearly all dust filters made are available only as **housed units** . . . BUT with DAY "AC" filters, housing is optional. Housed units are necessary when located outside or when placed on suction; UNHOUSED DAY filters can be placed in any convenient plant location. Using DAY UNHOUSED filters means you not only eliminate the cost of filter housing and exhaust piping but cut your fuel bills as well.

DAY "AC" filters are used to clean air in all types of industry . . . for filtering atomic energy dusts and even the air in oxygen manufacturing plants where the elimination of air pollution is most essential. For more information about DAY "AC" dust filters write for Bulletin F-75. It contains useful charts and air engineering data. Write toDAY for your free copy.

*Licensed by H. J. Hersey, Jr.

The **DAY** *Company*

SOLD in UNITED STATES by
The DAY SALES Company
822 Third Ave. N.E., Minneapolis 13, Minn.

MADE and SOLD in CANADA by
The DAY Company of Canada Limited
20 Brydon Drive, Rexdale (Toronto), Ont.

Representatives in Principal Cities

EQUIPMENT ONLY OR A COMPLETE SYSTEM

KEEP YOUR ELEVATOR DRY

... Like General Mills did in Wichita, Kans.

CHECK CONCRETE DECAY

Excessive moisture causes concrete decay. Western Waterproofing Company checks water penetration at its source. That's why leading elevator and processing plant owners specify Western for:

- **CONCRETE RESTORATION**
- **PRESSURE APPLICATION OF CONCRETE**
- **MORTAR JOINT REPLACEMENT**
- **PUTTING JOINTS IN MOVEMENT**

(No Materials For Sale)

Preventive maintenance pays. Write for folder "Maintenance and Restoration of Concrete Storage Tanks."

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A Missouri Corporation And Its Affiliate
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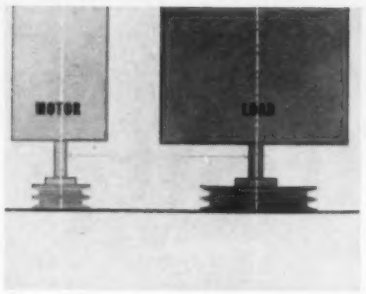


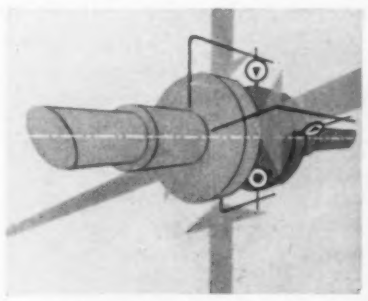
In lining up an offset drive, whether it involves V-belt drives or gears, the first step is to make sure that each shaft is level. Use a straightedge to see if the motor needs to be moved along its axis or angularly to bring the two sheaves in line. When the belts are mounted, they should be taken up just enough to assure a non-slip engagement—no more. The less cross-tension there is, the better it will be for all the bearings involved. Proper and firm positioning are necessary not only to control the forces which cause vibration but also those which cause thrust.

ed, the other machine should be examined for sources of vibration.

5. If vibration trouble seems to date back to its repair, check rotor for balance—dynamic balance if possible, otherwise static. Capscrew the needed weight to point of unbalance, hooking weights around part of motor to relieve pull on screw.

The best running position for the motor rotor is its magnetic center. When starting up, a rotor oscillates to find this center, unless physically prevented from movement. Motors should not be operated with the magnetic center forcing the rotor shaft up against a bearing shoulder. Usually these shoulders can take very little loading without damage.

A motor rotor with sleeve bearings and belted drive should be free to oscillate so that any wear is spread over a wider area and kept more even. If not, a change in alignment may permit the shaft to float back and forth axially.



In aligning a direct flexible coupling of a sleeve bearing motor to its load, every alignment check must be made at least twice, from positions at right angles to each other. A dial indicator or feeler gauge should be used and both halves of the coupling should be rotated together, just as they do when the machine is running. After the shafts are angularly aligned, the motor should be moved until rotation of both coupling halves shows the axis to be the same at all four points around the shaft as indicated here.

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FOR MILLERS
The Chatfield & Woods Sack Co.
CINCINNATI, O.

SUPERIOR CARBIDE TOOLS
For All Roll Corrugating
Economical Increased Output
CORRALLOY TOOL CO.
Minneapolis 7, Minn.

Danger of Overload

Overload can cause motors to heat up and eventually break down or burn out, even though modern insulations can take a lot of punishment. To safeguard against it, motors are often provided with "overload protection" in the form of thermal elements or fuses. The element should never be more than the recommended value as listed in the national code. As a further safeguard, conditions that trip or blow the overload protection devices, such as obstruction in the driven or driven machine, excessive friction within the motor, or an effort to obtain greater output from the driven machine than the motor is capable of carrying, should be avoided.

Although the penalties are less severe, underloading an induction motor is just as improper as overloading it. First step in correcting a condition of underload causing low power factor is to determine the rated capacity of each induction motor and its actual load.

(Turn to MOTORS, page 17a)

JONES-HETTELSATER CONSTRUCTION CO.
Designers and Builders for Milling Companies
1911 Baltimore Ave. KANSAS CITY 6, MISSOURI

Some of those groceries would be as out of date today as the rumble seat itself! As you know, new processing methods, new packaging, new ingredients have changed many food products.

Even staples like family flour have been improved, thanks to vitamin enrichment. Today, food buyers *expect* food products to carry the "ENRICHED LABEL".

Twenty years ago, just about the time the rumble seat was on its way out, mass production of vitamins was just getting underway. One of the first companies to master the techniques of manufacturing quality vitamins was Chas. Pfizer & Co., Inc.

Since the middle 1930's Pfizer has continually been a leader in developing new and better forms of vitamins for the food and pharmaceutical industries. Pfizer BI-CAP® was one of the first enrichment concentrates. And this "head start" in vitamins has continued. It means that Pfizer can help you with the newest developments in enrichment products.

PFIZER BI-CAP has recently been improved through vitamin research. It is now a lighter color enrichment mixture with an even dispersion that overcomes unsightly agglomeration. All three forms of BI-CAP are also made with thiamine mononitrate for Better Vitamin B_1 stability.

Continued Pfizer research in riboflavin, thiamine and other nutritional additives such as amino acids will help you offer improved flour for tomorrow's improved bread and baked goods. Look to Pfizer for the finest enrichment concentrates.

CHAS. PFIZER & CO., INC., Chemical Sales Division, 630 Flushing Ave., Brooklyn 6, N. Y.
Branch Offices: Chicago, Ill.; San Francisco, Calif.; Vernon, Calif.; Atlanta, Ga.; Dallas, Tex.

PIONEER
AND LEADING
MANUFACTURER OF
VITAMINS
Pfizer

An important forward step

How the formation of Simon-Carter benefits the milling industry

An industry that depends on efficiency, accuracy, and precision in the preparation and processing of its product, as does the milling industry, depends very greatly on machines—and on the engineering, designing and manufacturing skills that make them.

The formation of Simon-Carter Co. brings together into *one* organization two of the greatest pools of such skills serving the milling and grain industry today. To you, as a miller, this new company means broader facilities in plant engineering, in machine design, production and installation, and in operational services.

All that Simon or Hart-Carter has meant to your company is held in the new organization.

Simon-Carter Co. is jointly and equally owned by Hart-Carter Co. of Peoria, Illinois, and Henry Simon (Holdings) Limited of Great Britain. The new company takes over the American operations of Henry Simon Ltd., Hart-Carter's industrial machinery division with its 2 Minneapolis manufacturing plants, and under the name Hart Emerson Simon Ltd., the Canadian operations of Hart-Emerson Ltd. Simon-Carter is strictly a United States based and operated company. It will continue to feature all of the extensive line of modern mill equipment of Simon design as well as all of the unique and exclusive principles of separating, grading, and classifying, represented in world-famous Hart and Carter machines. Expansion of plant and office space is planned at Hart-Carter's former Minneapolis headquarters and all personnel of both predecessor organizations are now a part of the enlarged Simon-Carter family for the service of all Simon and Hart-Carter customers.

SC

SIMON-CARTER COMPANY

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in the service of flour millers

NEW ORGANIZATION POOLS ENGINEERING TECHNOLOGY AND EQUIPMENT-MAKING SKILLS

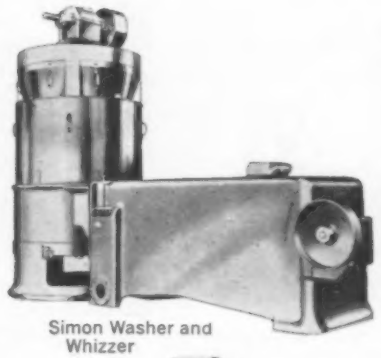
The pooling of mill engineering talents, man-power, research facilities and manufacturing resources in new Simon-Carter Co. will result in efficiencies and economies that will mean better machines, better service and greater profit opportunities for your company. Simon-Carter will manufacture outstanding machines, and will plan and install whole milling systems, from the Simon line—and will continue to produce the entire line of equipment made by Hart-Carter. Progress is the watchword as the newly merged organization moves forward to bring you constantly finer equipment, faster and more complete service. Here are a few of the steps ahead that spell progress:

- Expanded manufacturing areas
- Enlarged laboratory testing and research facilities
- Increased space for design engineers
- New development engineering services
- More field engineering consultants
- Broader factory service facilities
- Wider stocks of parts and accessories
- An expanded line of specialized machinery and equipment
- Greater values for customers through volume and production economies

Simon-Carter is ready—and anxious—to help you—The full service of the expanded Simon-Carter organization is yours to command. Literature on individual machines is available for the asking. Please write.

EQUIPMENT HIGHLIGHTS IN THE MERGING OF CARTER AND SIMON LINES

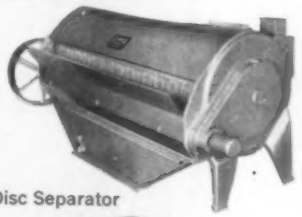
Carter Duo Aspirator



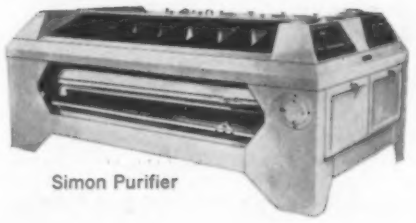
Simon Washer and Whizzer

Carter Millerator

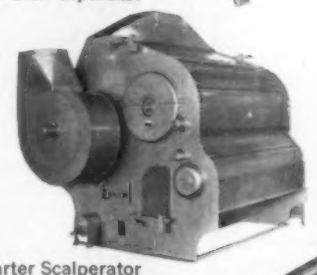
Simon Rollermill



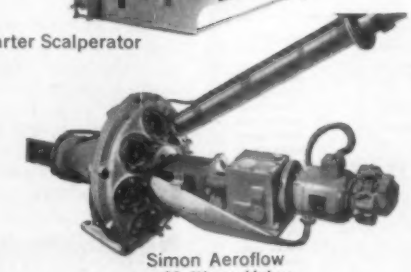
Carter Disc Separator



Simon Purifier



Carter Scalperator



Simon Aeroflow Multiway Valve

Simon Pneumatic Aspirator

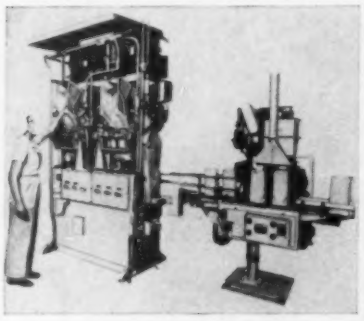
Worth Looking Into

New Products
New Services
New Literature

This reader service department announces the development of new and improved products, new services and new literature offered by manufacturers and suppliers. Claims made in this department are those of the firm concerned. Use the accompanying coupon to obtain the desired information.

No. 2056—Improved Packaging Machine

Bemis Bro. Bag Co. has introduced a new automatic packaging machine and scale capable of feeding and filling flour and cereal at more than



40 five-pound bags a minute with a weight tolerance of plus or minus .2 of 1 oz. The machine has been named the Bemis Feeding and Filling Machine and Trim-Weigh Scale. It requires only one attendant and can pack during any given period, the same number of bags as two conventional packers attended by four operators, Bemis claims. Under actual operating conditions, the new equipment has been consistently packing 48,000 five-pound bags per 24-hour operation day. Full details on engineering and operating specifications are available. Simply clip the coupon, check No. 2056 and mail it to this publication.

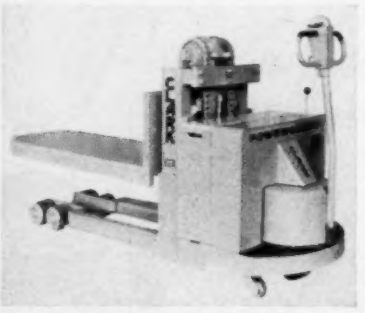
No. 2057—Level Control

A new Bin-Vue level indicator and control which features an easy-off cover and a fail safe device has been announced by Convair. Access to the unit is gained by a push-up, push-down and pull-off motion on the single-piece cover. The cover is held in place by compression of an "O" ring on the mounting flange. A limit switch, acting as a fail safe device, is activated 18 times a minute and can be connected for visible or audible control. This switch may also be connected to a relay circuit for automatic control. Failure of any part of the Bin-Vue will alter the signal and stop or start other equipment controlled by the Bin-Vue. In operation, a 1/100 H.P. motor turns a four-blade paddle at 9 R.P.M. by means of a torsion spring. The paddle turns continuously as long as no material touches it. When material makes firm contact with the paddle, the paddle stops. The motor

continues to run, turning the spring until it activates a limit switch. The switch kicks off the motor and any other equipment connected to the indicator. When the material falls away from the paddle, the torsion spring reactivates the paddle and, in so doing, unwinds from the limit switch, starting the motor and putting the entire unit in operation again. Check No. 2057 on the coupon for more information.

No. 2058—Platform Truck

A medium-lift platform truck for lifting and hauling skids has been added to the "Powrworker" line of battery powered hand trucks produced by the industrial truck division of Clark Equipment Co. The standard unit will lift 4,000 lb. A special 6,000 lb. capacity machine is



available. Maximum lifting height is 21 inches. The skid-carrying platform is 26 inches wide and is available in lengths from 36 to 60 inches in six-inch increments. Forward and reverse direction is controlled by a butterfly switch in the control head on the steering handle. Electric switches make it impossible to direct both forward and reserve current to the drive motor at the same time. For more information check No. 2058 on the coupon.

No. 2059—Open-Type Motors

"Super-Seal" open-type motors suitable for many applications previously requiring enclosed designs are described in a new bulletin released by Allis-Chalmers Manufacturing Co. Available in all integral horsepower frames, the motors are unaffected by moisture, dust, dirt, oils, acids and alkalies. The motors have an encapsulated stator design in smaller sizes and "Silco-Flex" insulation in larger sizes, both of which result in maximum protection. Copies of the bulletin can be obtained by checking No. 2059 on the coupon.

No. 2060—Speed Reducers

Link-Belt Co. has introduced a completely new line of shaft-mounted speed reducers, designed for a great variety of speed reduction needs. The new units are available as: single reduction drives in six sizes, with nominal ratios of 5 to 1 and capacities up to 50 H.P.; and double reduction drives in seven sizes, with nominal ratios of 15 to 1 and capacities up to 40 H.P. The new speed reducers can be mounted at angular as well as horizontal positions by using either tie rod or foot mountings. Positive lubrication is assured by live-action oil spray generated automatically through gear rotation, regardless of the position in which the reducer is mounted, the firm said. The new units are furnished with key for hollow shaft sizes and with bushings, complete with key for driven keyseat to adapt hollow shaft bore to smaller driven shaft sizes. For more information check No. 2060 on the coupon.

No. 2061—Technical Bulletin

The availability of an eight-page technical bulletin on practical pneumatic conveyor design has been announced by Sprout, Waldron & Co., Inc. Prepared by John Fischer, chief engineer, materials handling division, the article gives background information on how to select, operate and maintain pneumatic systems for transporting dry bulk materials. The bulletin covers positive, negative and combination systems. Copies of the bulletin can be obtained by checking No. 2061 on the coupon.

No. 2062—Fuller Bulletin

Equipment for the process industries is described in a comprehensive new 12-page, two-color bulletin offered by the Fuller Co. The new bulletin discusses applications and performance characteristics of Fuller-Kinyon pumps, Airveyor pneumatic conveyors, Fuller-Huron Airslide fluidizing conveyors, rotary compressors and vacuum pumps, horizontal-grate coolers, Humboldt suspension-type preheaters, Lehigh induced draft fans and hot gas washers, and Sutorbilt positive pressure blowers and gas pumps. Operating principles are explained, and photographs show typical installations. Check No. 2062 on the coupon to obtain copies of the bulletin.

No. 7212—Industrial Fan Bulletin

Bulletin No. I-585, issued by the Day Co., describes the firm's line of industrial fans. Construction features, applications, fan arrangements and selection information are described in the 16-page publication. Also listed are temperature and alti-

Send me information on the items marked:

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- ☐ No. 2057—Control
- ☐ No. 2058—Truck
- ☐ No. 2059—Motors
- ☐ No. 2060—Reducers.
- ☐ No. 2061—Bulletin
- ☐ No. 2062—Fuller Bulletin
- ☐ No. 7127—Dryer
- ☐ No. 7164—Bulk Trailer
- ☐ No. 7166—Aeration System
- ☐ No. 7192—Roller Mill
- ☐ No. 7212—Fan Bulletin
- ☐ No. 7214—Drums

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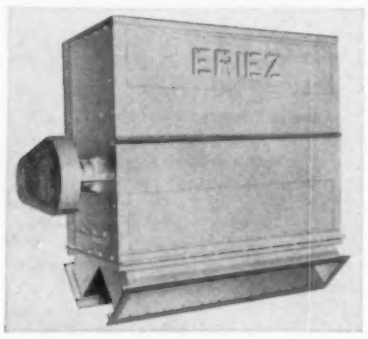
tude selection data, capacity tables, dimensions, special arrangements and special types of fans. The company's fans are manufactured in a variety of sizes with capacities ranging from 1,000 to 30,000 CFM and static pressures from 2 to 15 in. Check No. 7212 on the coupon and mail to this publication for more details.

No. 7214—Magnetic Drums

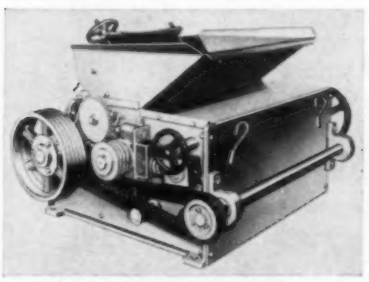
The Eriez Manufacturing Co. has announced that its new line of permanent non-electric magnetic drum separators will now be available with replaceable outer shell covers and bearings, and with increased magnetic strength, All material to be cleaned by the drum is fed directly



onto the revolving shell; non-magnetic material is discharged first and separately, while tramp iron is held against the shell by stationary Alnico V magnetic castings, internally mounted, until it passes beyond their magnetic field. Wear on the shell results and under the new system, a replacement can be installed quickly and without dismantling any other parts, the company says. Check No. 7214 and mail for details.

No. 7192—Grain Roller Mill

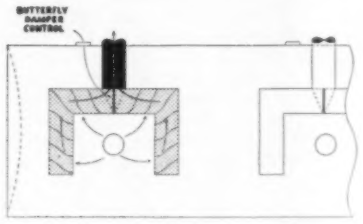
A grain roller mill featuring "mill-type" features and construction has



been added to the line of the W-W Grinder Corp. The mill was designed to handle all types of small grains including shelled corn, oats, barley, sorghum grains and wheat, the company stated. The rolls in the unit come in 6-in. sections so that one section can be replaced without having to purchase an entire new roll. Further details are available by checking No. 7192 on the coupon and mailing. Please print or type.

No. 7166—Grain Aeration System

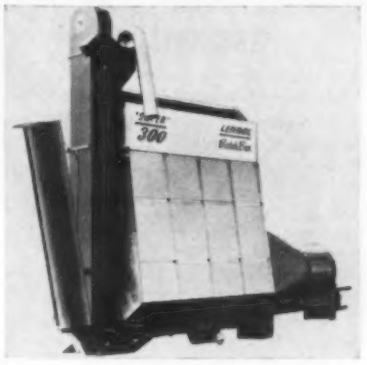
An aeration system that permits pressure and air flow equalization throughout a flat storage building has been made available by the Monroe Grain Aeration Co. In introducing the new system, the manufacturer points out that problems arise in flat storage because of grain "heaping" directly below fill openings. Its new "U-Duct" system is designed to provide concentration of air flow at high points in the heap, and reduction at low points, thus providing maximum aeration activity at points



where it is needed most, in addition to equalizing pressures. A partial or complete damper shut-off, controlled from outside the building, permits isolated aeration of specific trouble or danger spots within the storage facility. Details are available by checking No. 7166 on the coupon and mailing to this publication.

No. 7127—Grain Dryer

Lennox Industries, Inc., has announced a new "Super 300" dryer which handles batches of 75 to 300 bu. per batch. It has all the features of the company's larger "Super 600." The dryer has LPG gas direct fired heat section with output of 500,000 Btuh to 4 million Btuh, large air delivery, 33% free area perforated side walls, powered metering rolls for slow and even recirculation, bucket elevator with unloading rate up to 1,500 bu. per hour and partial batch drying without heat loss. It can be used with the Lennox CD3 indirect oil-fired crop dryer as the heat and air supply. Check No. 7127



on the coupon and mail it for more information.

No. 7164—Pneumatic Bulk Trailer

A new type of pneumatic trailer has been designed by the Albert Air Conveyor Corp. By using pressurized tanks, screw conveyors and rotary valves are eliminated. There are no moving parts in contact with the product. Material is delivered in the "Dense-Flo" conveyor at low velocity through pipes directly into customers' storage bins. A built-in dust collector on the trailer eliminates dust, and uses a closed-air-return system. Check coupon No. 7164 and mail it for further information.

CHECKERBOARD GRAIN COMPANY

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ESSENTIALS

(Continued from page 1a)

we become old faster and shorten our life span.

Vitamin C is necessary for the formation of materials which lie between the cells of the human body. It plays an important role in tooth formation, bone formation and repair. The inadequate healing of wounds is often the result of lack of Vitamin C.

Niacin plays a part in the transport of oxygen from our bloodstream to tissue cells. Lacking niacin, one feels as if he cannot get enough air. As a result of the lack of oxygen in our body, heartbeat and pulse go up.

Vitamin B1 is also concerned with the transport of oxygen from the bloodstream to the cells. The lack of Vitamin B1 is not as dramatic as in the case of niacin. Generally, one feels nervous and out of sorts. If Vitamin B1 is not present in the diet of children for long periods of time, their growth can be stunted.

A deficiency of Vitamin B2 is easily recognizable. It is involved with the transport of energy in the body, taking the energy from the place where the food is burned to the spot where it is needed. A good example is the flexing of your muscle. Vitamin B2 helps carry the energy to the muscle in order that we can move. The absence of Vitamin B2 can cause other complications—scaly skin and cracks at the corner of the mouth, for example. Dimness of vision can result from prolonged deficiencies of Vitamin B2 and can result in cataracts.

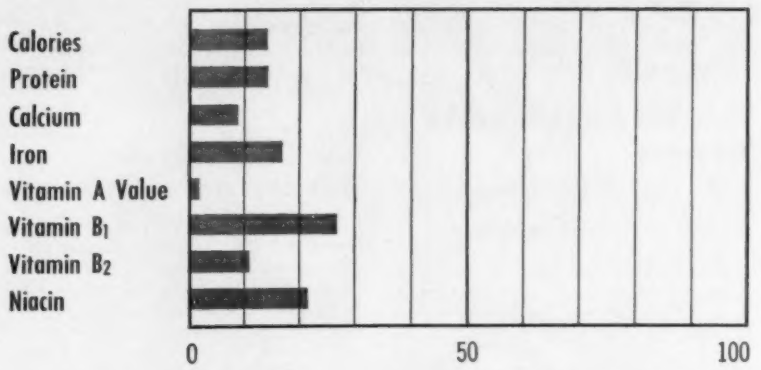
NO PARENT WOULD WISH his child to suffer the consequences of the deficiencies of these essential food elements. No one wants such problems himself. This cannot occur if we buy the proper foods. The question so often asked, however, is how can we do this when faced with the problem of a large family and limited food budgets? Miss Page and Miss Phipard of the Institute of Home Economics Research Division have the answer. A balanced diet does not mean expensive menus.

An interesting thing about the new facts presented in the booklet of the Institute of Home Economics is the place that bread and cereals have in the menu planning of the modern housewife. Milk particularly gives us calcium. Meat supplies protein. Fruits and vegetables are valuable because of the vitamins and minerals they contain, particularly Vitamin A and Vitamin C.

The bread and cereal group, however, furnishes worthwhile amounts of a large number of nutrients. The pamphlet stresses value of the grain foods in the diet in this way, and I quote, "The importance of grain foods in the diet rests on their many-sided nutritional contribution at relatively low cost rather than on large contributions of one or two nutrients." In other words, in the cereal

Bread and Cereal Content

Contributions of 4 servings to recommended daily diet for average adult.



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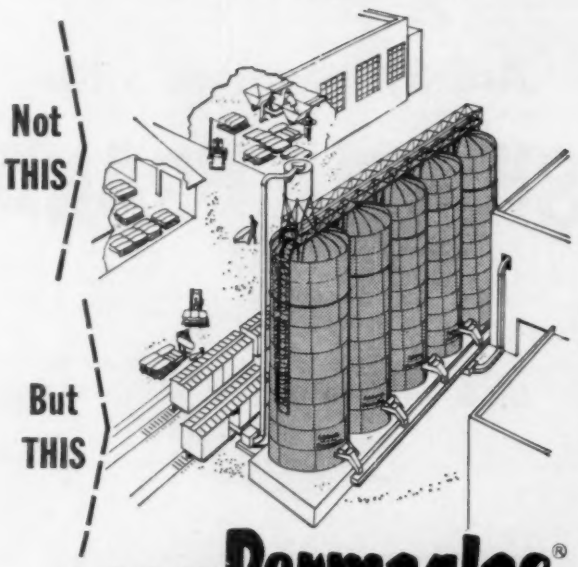

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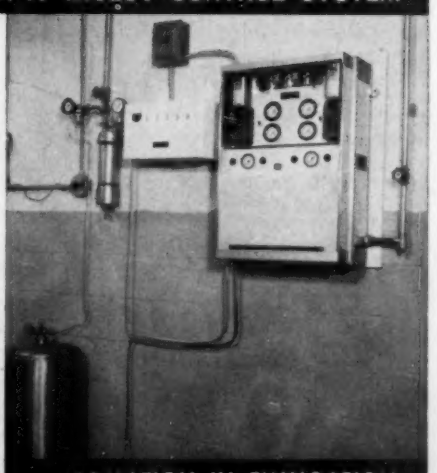

AUTOMATION IN FUMIGATION

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grain food group, we have a relatively balanced diet.

According to calculations, if we were to eat enough bread to contribute all of the calories required per day, we would also be getting all the protein, iron, Vitamin B1 and niacin we need. This is an important observation. A pound and five-eighths ounces — approximately 32 slices — of bread give us enough calories, protein, iron, Vitamin B1 and niacin. In other words, bread alone can supply five of the nine essentials. In addition, it would give us 56% of our calcium requirements, 8% of our Vitamin A requirement and 80% of our Vitamin B2 requirement, and all this at a cost of less than 35¢ a day.

No one would advocate that we should live by bread alone. On the other hand, bread can be an inexpensive part of every daily meal and it's an ideal food to eat between times when hungry. It is comforting to know that this is a nutritionally sound practice—one which is bound to be more important in the years to come.

EDITOR'S NOTE: This article by Dr. Larsen originally appeared in Pillsbury People, the Pillsbury Co. employee magazine.

BY 1975, we are expecting the population in the U.S. to be well over 200 million people. At the same time, we are aware that the amount of land which can be cultivated in the U.S. is limited. Dr. K. Weckel of the University of Wisconsin says that the amount of cultivatable land in the U.S. is between 300 and 400 million acres. These acres were in use by 1910 and have not increased much over the last 48 years.

The inevitable result of limited farm land and increasing population will be that the price of animal products—that is, milk, cheese, eggs and meat—will rapidly increase in price while products such as fruits and vegetables, potatoes and flour will become relatively less and less expensive. The reason for this is evident.

Animals must eat to live. In so doing, at least 80% of the food that they consume is used to maintain life. This is 80% lost forever. In other words, only 20% of the food that an animal eats is converted into animal products which we can later use at our table. Consequently, these animal food sources, since they are so wasteful in converting plant food to animal food, must demand a higher price and do, relative to grains, vegetables and similar products.

All heavily populated countries are basically on a vegetable, cereal and fruit diet. A preference for meat becomes an expensive luxury. This is true of India, this is true of China and this is true of the heavily populated portion of Africa. And as our population increases, we rapidly approach this era in our great country.

The question which has been asked time and time again is, "Are the proteins from products such as flour as good for the body building in humans as the protein from meat?" The answer is clear: yes, they are. The difference is that one needs to eat more flour proteins to do the same job.

If the choice is one of money, is it cheaper to use animal protein or is it cheaper to use plant protein? The answer is clearly in favor of plant protein.

PLANT PROTEIN is as good a source of calories as animal protein. When the protein is being used for building muscles and the like, one needs about one and one-half times as much flour protein as animal protein. This is taken into account by nutritionists when planning menus.

The problem of protein requirement has been studied for years by Dr. H. H. Mitchell of Johns Hopkins University. He was publishing his first results in the twenties. In this work, Dr. Mitchell showed that rats needed about twice as much plant protein, particularly flour, as animal protein to do an equivalent of body building jobs. This figure has been used for some time. More recently, Dr. Mitchell has repeated his studies on human beings. Since human beings are not rats, it is logical to assume that the results would be different, and so they are. Dr. Mitchell and co-workers, Drs. Bricker and Kinsman, found that for every pound of animal protein one needed slightly more than a pound and one-half of flour protein.

Dr. Mitchell's findings are of such great importance that they are being used by the Food and Agriculture Organization of the UN to plan feeding programs for distressed areas of the world. Dr. James Hundley, director of FAO, reported at the New York Academy of Science on these plans in the paper entitled "Enrichment of Foods with Protein." Dr. Hundley indicates that, as a consequence, the FAO of the United Nations is basing their feeding program on plant products, realizing that a feeding program based on animal products is far too expensive to be considered or to be practical.

These facts are important. Today's families, like our grandparents', are large. Our grandparents knew what to do. If the children were hungry, they ate bread. The results were apparent; the family grew into strong, healthy adults. Science is just beginning to prove what grandmother knew already.

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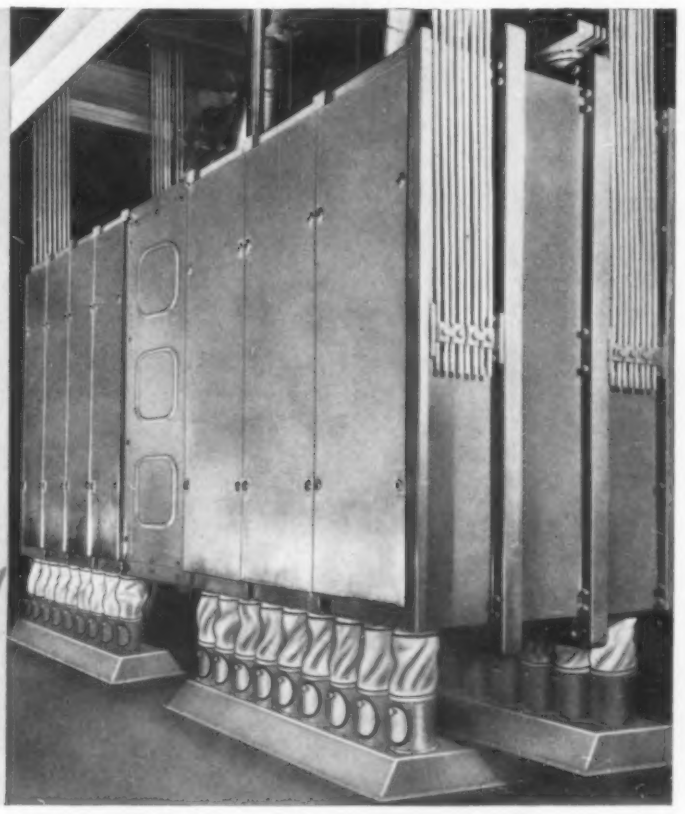

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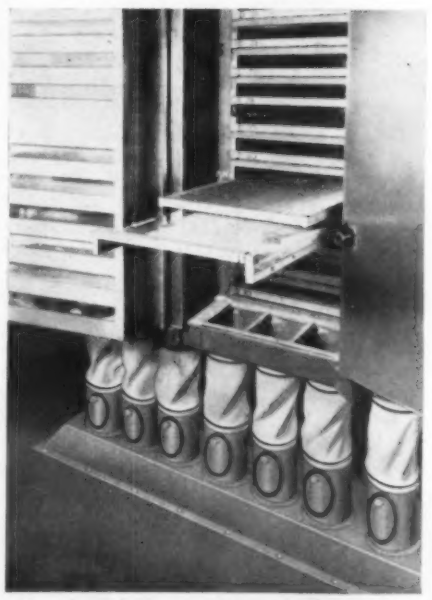

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Increasing Efficiency Of Materials Handling

By Ernest W. Fair

WHEN we are seeking ways and means of reducing overhead in the mill there is no better spot at which to conduct our investigation than in materials handling. Here is the most neglected of all phases of mill management. Here is where it is easiest to slip into too costly operating procedures.

Here are 14 suggestions as to how we may increase efficiency in materials handling in the mill and, of course, in so doing increase output as well as lower operating overhead. They are based on tried and proven procedures.

1. Search for methods of securing greater safety in materials handling not only from the standpoint of costly accident reduction and materials spoilage involved but maximum safe handling is always the most efficient handling. Some 22% of all industrial accidents are connected with handling.

Unsafe habits and unsafe methods used in materials handling are easy to develop. Rules and procedures once laid down can be frittered away until the original procedures have almost been forgotten by everyone concerned. We can, at almost any given time, discover one or more steps to follow in securing greater safety in materials handling in our mill.

2. Reduce the amount of rehandling required The best and least costly method is direct movement from an original spot to the place of use. Any additional rehandling of any given item adds to costs and reduces efficiency. Better location of storage areas is one step. Another may be establishment of storage areas closer to the spot of use. In any mill a routing study of the movement of such materials will usually uncover a source of savings on this particular point.

3. Move in unit loads It is quicker to move a number of items as a unit than it is to move them individually. Inadequate facilities around machines for storage too often account for the too frequent handling of many such small loads simply because there is no available space adjacent to equipment for such storage. A close study of handling costs may often reveal it more profitable to provide such space than to put up with constant movement and supply of materials.

4. Use gravity wherever it is possible to do so—it is still the cheapest method of handling materials. Too often, as we mechanize, we are carried away with the possibilities thereof and completely abandon all gravity movement of materials where it would be most economical and efficient to retain some and discard others. Wherever and whenever possible to employ gravity in flow of materials it is still the cheapest and most efficient method.

5. Where gravity will not suffice then use mechanical means where practical to do so. In planning materials handling the most efficient procedure (and that is always the most economical) is and should be the guiding procedure so long as it stays within reasonable costs. Dependence on one single system has some advantage but it seldom outweighs the practical aspect of tailoring our materials handling methods to the materials, the mill process and the location.

6. Establish schedules and procedures for maintenance of materials handling equipment There is nothing more inefficient and costly than haphazard practices in maintenance of this type of equipment. In every instance where the company has set up definite schedules and procedures covering every single piece of materials handling equipment maintenance costs have been reduced sharply. Efficiency is the invariable result simply because there are fewer breakdowns and every piece of equipment continues operating efficiently all through its maximum useful life.

7. Select proper equipment for the job. No one type of make of equipment is adequate for all materials handling. Every kind and type of material calls for a different system of materials handling. Thorough investigation of practical use of the various types of such equipment in our own field and in our own area should be made before any is selected or replaced. Too often selection and purchase of materials handling equipment is governed chiefly by cost considerations Invariably the least expensive unit may in the long run be the most expensive when it cannot handle the job as efficiently as a unit which may have cost a few more dollars of capital investment.

8. Integrate the equipment into the plant handling system more efficiently. Too often no thought to this problem is given when equipment is first selected. Actually, if we desire top efficiency, it is as important as in any other phase of the mill operation. The best job is always done when thorough teamwork of men and machines has been set up. When replacement time comes on any unit of materials handling equipment we now have, then and there is the time to study closely how best we can obtain this integration.

9. More coordination of the operation of materials handling equipment can usually be worked out by close study of the whole procedure. Better planning of its use, reducing idle time of equipment or men, adapting single units to handle more and more problems, and similar steps will yield results on this score.

10. Reduce terminal time of power units The time it takes to unload a power unit costs money. Often the truck stands around a given spot of delivery for a considerable period of time when it could be used elsewhere. In larger mills where many trucks are in use their number (and men needed to operate them) can often be reduced by cutting down on this waiting period The use of trailers and pallets is the most common method of keeping down the number of lift trucks required in any mill. One can buy a large number of such trailers and pallets for the investment in a single power unit. Maintenance costs are also reduced as are general overhead expenses.

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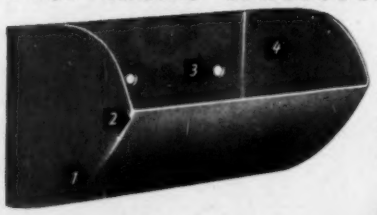

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CALUMET CUPS

11. Standardize equipment and methods used in all phases of materials handling in the mill. The biggest advantage we will receive is in reduction of maintenance and repair costs and in the amount of instruction required for use There is also tremendous advantage to be obtained through increased efficiency in use of all such materials handling equipment through practice of the maximum amount of standardization of both equipment and methods.

12. Select materials handling equipment for flexibility. Today's set jobs or procedures will seldom stay that way tomorrow, changes always occur. The more flexible any piece of equipment may be the less need there exists for replacement of present units or purchase of additional equipment to handle these changes which are sure to come about in the future.

13. Select materials handling equipment for the lowest overall handling costs. These are the day-in and day-out expenses in operating such equipment. Any savings made in lower original cost of purchase amount to nothing unless lowest possible handling costs are assured. The latter should always be the most important factor to consider in selection of any and all types of materials handling equipment.

14. Review mill layout from the viewpoint of securing greater efficiency and lower costs of materials handling from time to time. Too often this consideration is never given when studying any problem of layout; it should never be neglected. And, in many cases, changes which have come about during recent months will make it possible to secure great savings in materials handling through minor changes in layout.

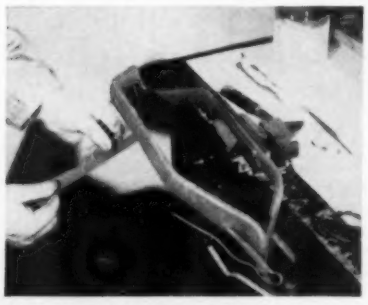
MOTORS

(Continued from page 9a)

If a plant has been consistently over-motored, it may be possible to advance most motors, except the largest, to heavier jobs, replacing the smallest motors with even smaller ones of proper capacity.

Minimizing underload is the preventive way of improving power factor. Corrective measures include the increased use of synchronous motors, capacitators and synchronous condensers. What ever the method, improving power factor in your plant gives you more satisfactory production power and other benefits which accrue directly from the efficient operation of your electric motors.

What about repairing the modern motor? In the unlikely event of an epoxy-encapsulated stator breakdown, chances are you're best off to get a replacement winding from the manufacturer. Vulcanized silicone-rubber-insulated coils can be patched by a very simple process. If coil damage is in an accessible location the repair can be made without removing the coil from the winding. Coil removal is much easier with silicone-rubber-insulated coils than with the old-fashioned taped and varnished types since they're flexible, even after long aging, and are never varnished and baked in the slots.



Silcone-rubber insulated coils are not readily damaged, but can be repaired by cutting away the injured portion, building up with silicone rubber tape, as shown, and vulcanizing the patch to the coil.

MODERN MOTOR DO'S AND DON'T'S

DO treat it like any other motor—as far as bearing and mechanical parts are concerned.

DO wash away dust and dirt with a low pressure water stream.

DO clean off grimy deposit with detergent and water—or any commercial cleaning solution.

DO watch the motor's nameplate rating for load and temperature limits.

DON'T worry about splashing or dripping moisture in the motor area.

DON'T worry about dry-out periods for shut down motors.

DON'T varnish silicone-rubber coil surfaces. Cording and blocking can be revarnished if necessary.

DON'T exceed rated temperature limits just because you feel the insulation can take it.

BUT! First make sure your motor is a modern motor with an adequately protected insulation system such as vulcanized silicone rubber or fully-sealed epoxy encapsulation.

——BREAD IS THE STAFF OF LIFE——

HEADHOUSE CONSTRUCTION

ADRIAN, TEXAS — A new headhouse is being constructed atop the Adrian Wheat Growers elevator. The firm explained that the new headhouse will give it more and faster working capacity.

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INSIDE SCIENCE

THE VITAL STORY OF

Breakfast Cereals

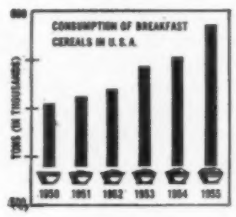
with essential vitamins and minerals restored

by Science Writer

New Edition

AMERICA LIKES BREAKFAST FOODS

Let no one doubt the popularity of breakfast cereals among Americans. The chart below traces the consumption of these fine foods between 1950 and 1955. During that period annual consumption rose by *76,000 tons*. In just one year, 1955, Americans ate 2½ lbs. of hot and 4.8 lbs. of cold cereals per person!



Why are breakfast cereals so well-liked? They are tasty; they are easily served; they appeal to busy homemakers, as well as institutional dietitians, because they are readily available in a variety of flavors at a modest cost. They add interest and value to an important but sometimes neglected meal—breakfast. Their use is extending to between-meal and party snacks, too.

Many grains are processed to make breakfast cereals: wheat, corn, oats, rice. Eaten with fruit and milk or light cream, they contribute an excellent combination of basic, flavorful, nutritious foods to the diet.

Better Foods for Better Health Through Restoration

The science of nutrition has advanced rapidly. In the manufacturing process of some cereals, some of the essential "B" vitamins and minerals are subject to some loss, just as with other foods.

These losses are inescapable when such grains are prepared for human use. When this became known, manufacturers acted to overcome the losses. They adopted restoration.

Restoration simply means that certain important vitamins and minerals are restored to the cereal food during processing, so that the vitamin and mineral values in the finished product are generally equal to the whole grain values of those elements. Wheat, corn and rice products are customarily so treated. Vitamins B_1 (thiamine), B_2 (riboflavin), niacin (another "B" vitamin), and the mineral, iron, are those most widely restored. Vitamins C and D are also sometimes added.

Pre-sweetened cold cereals emphasize the nutritional importance of added vitamins. Increased calories require more "B" vitamins for best utilization of the food.

Why the Vitamins are Important

Physicians and diet experts have proved that vitamins are essential to prevent certain deficiency diseases and to contribute to good health.

Vitamin B_1 (thiamine) helps build and maintain physical and mental health. It is essential for normal appetite, intestinal activity, and sound nerves. A lack of this vitamin leads to beriberi, a rarity in the U. S. A., but still a very serious health problem in other parts of the world.

Vitamin B_2 (riboflavin) is essential for growth. It helps to keep body tissues healthy and to maintain proper function of the eyes.

Niacin is needed for healthy body tissues. Its use in the American diet has been largely responsible for the virtual disappearance of pellagra, a serious disease.

Vitamin D helps children develop normal teeth and bones. It prevents the development of certain abnormal bone conditions in adults.

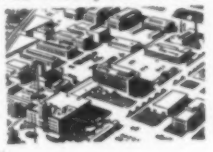
Iron is essential for making good red blood and for the prevention of nutritional anemia.

Where Do the Vitamins Come From?

At about the same time that processing losses in breakfast cereals became known, other developments in the scientific world made available ample supplies of vitamins at economical prices. Thus, the nutritional contribution of some breakfast cereals could be, and was, greatly improved through restoration.

Since the early days of breakfast food restoration and of white flour and white bread enrichment, the world-famous firm of Hoffmann-La Roche has supplied top quality vitamins *by the tons*. Pioneering work in its laboratories and by its collaborators resulted in the "duplication" of some of nature's extremely complex substances. First, the chemical composition of the vitamin was learned. Second, the pure substance was isolated. Third, the "duplicate" was made by synthesis. And fourth, the laboratory techniques were extended to large scale commercial operations.

The manufactured "duplicate" is identical chemically and in biological activity with nature's own product. A vitamin is still a vitamin regardless of whether nature or man made it. So efficient is large-scale manufacturing, that vitamins are sold at a lower cost than if they were extracted from natural sources.



This article is one of a series devoted to the story of vitamin enriched or restored cereal products: white flour, white bread and rolls, corn meal and grits, macaroni products, white rice, breakfast cereals, farina. Reprints of this article, of any other in the series, or of all are available without charge. Please send your request to the Vitamin Division, Hoffmann-La Roche Inc., Nutley 10, New Jersey. In Canada: Hoffmann-La Roche Ltd., 1956 Bourdon Street, St. Laurent, P. Q.

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Paul Logue in New Monsanto Position

ST. LOUIS—Paul Logue, assistant director of development for Monsanto Chemical Co.'s inorganic chemicals division, joined the development department of the company's research and engineering division as manager, market research, Oct. 1, David T. Mowry, department director, has announced.

Mr. Logue received a B.A. degree from the University of Tennessee and joined Monsanto at the time the Swann Chemical Co. was acquired in 1935. He served in several research positions both before and after joining Monsanto until he transferred into sales development work in 1938. He became technical sales director for the inorganic chemicals division in 1950 and market development manager in 1952. He was named to his present position in 1957.

In addition to holding several patents, Mr. Logue has contributed several articles to technical publications in the fields of leavening agents, phosphates, and detergents. He is widely known in the food technology field, and in 1946 served as president of the American Association of Cereal Chemists. He is a member and past chairman of the chemicals in foods committee of the Manufacturing Chemists Assn.

William E. Pfeiffer Richard Anderson Robert Hill

ROLFES APPOINTMENTS—William E. Pfeiffer has been appointed chief engineer to head up the six man engineering section of Rolfes Grain Aeration Companies at Boone, Iowa. A graduate of Iowa State College with an Agricultural Engineering degree, Mr. Pfeiffer was with Martin Steel Products Corp. for five years designing equipment for processing small grains. His experience also includes research, design and engineering on crop drying and aeration systems with Dr. Henry J. Barre, Rolfes consulting engineer. Two new sales engineers also have been added to the Rolfes staff which now totals 16 men coast to coast. Richard Anderson, a University of Washington graduate and experienced grain equipment, salesman, has taken over the western Kansas area. Robert Hill, a sales engineer with 12 years experience in crop drying, aeration and fan selection has the North and South Dakota area.

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New Derivative Of Corn Starch Has Many Uses

A new starch derivative developed by the U.S. Department of Agriculture holds promise for a variety of industrial applications, ranging from oil-well drilling muds to cosmetics. Recent research on starch—the most valuable constituent of corn—at the USDA's Northern Utilization Research and Development Division, Peoria, Ill., has produced the versatile new material, called cross-linked dicarboxyl starch.

One of its potential uses is as a thickening agent in various paste-like products. USDA scientists believe the new starch may prove valuable in the manufacture of paper, paints, textiles, and food products, as well as cosmetics, toiletries and drilling muds.

Finding means of chemically treating starch to change the way it responds to water and heat is one aim of USDA research on starch utilization at Peoria. Cross-linked dicarboxyl starch is one of the latest developments in this work.

When ordinary corn starch is dissolved in water and boiled, a thick paste results. When it cools, the starch jells and cannot be poured. This property makes starch unsuited for many industrial uses it could otherwise serve.

In some applications it is desirable for starch granules to take up water and swell to a certain extent, but not to jell when cooled. In producing the new non-jelling starch, the first step is a chemical process known as cross-linking. It retards water uptake and swelling. Enough cross-links can be added, if desired, to prevent starch from swelling even at temperatures above the boiling point of water. Modified starches of this type have been produced for use as dusting powders.

Additional chemical treatments of cross-linked starch are necessary to obtain dicarboxyl starch. One of them results in making the starch acidic. This increases its ability to absorb water and to swell when heated, but at the same time the cross-links hold the starch molecules together and help them resist jelling.

Mill Designing Firm Formed At Portland

PORTLAND — The formation of a new mill designing and construction firm, the Blasen Co., was recently announced by Richard M. Blasen, Portland. Offices and plant facilities will be located here and at Seattle.

Metal fabrication work will be produced and installed by an affiliate company, Archer Blower and Pipe Co., Inc., with plant facilities in Portland and Seattle. Engineering and production will be carried on and directed by the Blasen Co.

In addition to complete mill design and installation work, metal fabrication of elevator legs, screw and belt conveyors, bins, dust systems and spouting, processing and handling machinery will also be available to the buyer, the Blasen firm announced. The equipment to be handled by the new firm serves basically grain handling and storage, flour and feed milling, bakery, seed processing, feed lots, plant food and chemical industries.

Equipment for the pneumatic handling of grains, flour and feed products and other free flowing materials, truck and car unloading are also specialties with the firm.

R. M. Blasen, a registered mechanical egineer in Oregon and Washington, has a background of 18 years experience in engineering, manufacturing, metal fabrication and construction work.

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Use of Malathion In Stored Grain Approved by FDA

Malathion has been approved by the Food and Drug Administration for use in stored grain to protect it against insects. A tolerance of eight parts per million has been established. The insecticide may be used on or in stored barley, corn, oats, rice, rye, grain sorghum, wheat or peanuts.

The approved dosage is 10 oz. of actual malathion per 1,000 bu. mixed with the grain, and 5 oz. of actual material per 1,000 sq. ft. grain surface.

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